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Review Article

Phytopharmacological review of *Bunium persicum* (Boiss) B. fedtsch.

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ABSTRACT

Bunium persicum (BOISS) B. Fedtsch belonging to family Apiaceae is native to the region of the limited zones of the West Asia, Khorman and grows to the areas of North Khorasan and Khorman, East of the Zagros range to Bandar Abbas and south area of the Alborz range in Iran. It is also found in North western parts of Himalayas. *Bunium persicum* is found growing naturally in sub-alpine and alpine habitats of North Western Himalayas. It is a perennial herb, dwarf 30cm to tall 80cm and its flowers are small, white in color.

Keywords: *Bunium persicum*, Apiaceae, North-Western Himalayas, perennial Herb

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Introduction

The Kashmir Himalayan Biodiversity, being nestled within north-western folds of the Himalaya, harbours a rich floristic diversity of immense scientific interest and enormous economic potential. The valley of Kashmir is very rich in high value aromatic and medicinal plants. More than 50% of plant species described in British Pharmacopeia are reported to grow in Kashmir Valley. Nearly 570 plant species are reported to be of medicinal importance.

Taxonomic classification of *Bunium persicum* (BOISS) B. Fedtsch.

Family: Apiaceae

Kingdom: Plantae

Phylum: Magnoliopsida

Genus: *Bunium*

Species: *persicum*

Phenology: Flowering in late June to September; Fruiting in September and October

Distribution:

Bunium persicum (BOISS) B. Fedtsch is a high value herbaceous spice among the treasures of aromatic plants and is classified as perennial herb having pleasant odour; distributed throughout western Himalayas, also cultivated throughout Iran, Afghanistan and Northern India. In Jammu and Kashmir Kala Zeera is confined to Hilly traits of Gurez, Machill Tangdar, Pulwama, Karnah, Karewas of Budgam

and Srinagar. High Altitude *B. persicum* favours higher oil yield, better quality of phytoconstituents and fragrance.

Chemical Constituents:

There are nearly about 166 species of genus *Bunium* but they have not been broadly subjected to chemical characterization as evident from the perusal of literature. The major phytoconstituents reported from the essential oil of the *B. persicum* reported were Caryophyllene, Gamma-terpene, Cumyl acetate¹, Cuminaldehyde, Gamma-terpene-7-al², Trans-3-carene-2-ol, Acetic acid, Methatriene³, p-Cymene, Cumyl acetate, Limonene⁴.

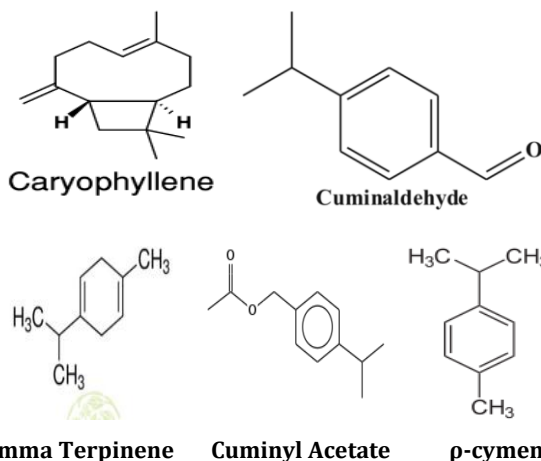


Table1: Morphological Characteristics of *Bunium persicum* (Boiss) B. Fedtsch.

Plant -	It is a perennial herb, dwarf (30cm) to tall (80 cm), compact moderately to highly highly branched and tuberous
Flower -	Flowers are small, white in color with readily symmetrical small Sepals, petals and stamens (each five in number) and are present in compact umbels.
Fruit -	Schizocarp consisting of two mericarps that are often attached to an entire or deeply forked central stalk (carpophore) with globular or elongated oil canals (vittae).
Stem -	Hollow in the internodal region with secretory canals containing ethereal oils and resins
Leaves -	The leaves are freely, pinnate (2-3), finely dissected and filiform.
Bract -	Bracts are linear and sometimes divided.
Bracteoles-	Bracteoles are absent with asymmetrical rays.
Gynaceum-	Bicarpellate with inferior ovary with two styles fused at the base.

**Figure 1:** Pictures showing *Bunium persicum* (Boiss) B. Fedtsch.

Traditional Uses:

Bunium persicum has been traditionally used as spice, appetizer, reduces Cholesterol, anxiety, depression, indigestion, dysentery, carminative, bronchitis, diseases of blood and ear, leprosy and convulsions⁵. The Kala Zeera seeds are used traditionally as stimulants, Carminatives and are useful in diarrhea and dyspepsia. *Bunium persicum* fruits in folkore have been used in foul breath, joint pain, lumbago and weak memory⁶. The seeds rich in essential oil are consumed widely as condiment. Also, this plant is used for culinary purposes and for flavoring foods and beverages. The seeds of this plant have widely used as an additive in food stuff such as in bread, cooking, rice and yogurt for its carminative and antispasmodic effect. It is also used as an antiallergic⁷.

Reported Pharmacological profile of *Bunium persicum* (Boiss) B. Fedtsch

Scientifically the plant has been proved to be useful in the following conditions:

Antibacterial:

A study on the extracts of *Bunium persicum* showed antibacterial activity by agar well diffusion and agar dilution methods. These two methods determine the zone of inhibition when compared with tetracycline zone diameter of inhibition as control. The *Bunium persicum* extracts showed antibacterial activity against *Bacillus subtilis* and

Staphylococcus aureus and the results indicated that it can be used for the treatment of *Bacillus subtilis* and *Staphylococcus aureus* infection⁸.

Antifungal:

A report on essential oil of *Bunium persicum* showed a potentiating effect of antifungal activity on cell wall degrading enzymes produced by fungal phytopathogens⁹.

Anticonvulsant Effect:

The essential oil and methanol extracts showed anticonvulsant activity against absence and grandmal seizures at dose 1mg/Kg. The study reported that the essential oil and methanol extracts of *Bunium persicum* evaluated anticonvulsant activity using Rota-rod method against Pentylene tetrazole (PTZ) and maximal electroshock (MES) induced convulsions produced in mice different doses. The essential oil and Methanol extract prolonged the onset of clonic and tonic seizures in Pentylene tetrazole (PTZ) induced mice. At higher doses tonic seizures were prevented by essential oil. The methanol extract was ineffective against MES induced convulsions but inhibited PTZ convulsions at dose 3g/Kg¹⁰.

Anti-Hematotoxic Effect:

Bunium persicum showed potential therapeutic effect against Reactive oxygen species –induced hematotoxicity. Different extracts of *Bunium persicum* were evaluated against leukemic blood induced hematotoxicity using in vivo model.

Hematological parameters as blast cells from the tibia, femur and the concentration of free radicals were measured in different group of animal models. The free radicals and blast cells were less in treating group (*B. Persicum* extract) of animals and the normal group when compared with disease control group of animals in which reactive oxygen species and blast cells were present in higher amounts. Also there was imbalance between haematological parameters in treated group of animals giving a correlation between free radicals and *Bunium persicum* plant extract administration thereby depicting a potential therapeutic effect of *Bunium persicum* against reactive oxygen species induced hematotoxicity¹¹.

Antihistaminic activity:

A study on aqueous and macerated extracts showed competitive antagonistic effect of *Bunium persicum* at H1 receptors. The maximum effect was observed in aqueous extract as compared to the macerated extract¹².

Antinociceptive and Anti-inflammatory:

A study on the analgesic and anti-inflammatory activity of Hydroalcoholic, Polyphenol and essential oil of *Bunium persicum* extracts showed the considerably significant effects by using different *in vivo* models like Carrageenan test, Croton oil induced ear edema and Formalin test¹³.

Antitoxoplasma Effect:

A study on the essential oil of *Bunium persicum* using *in vivo* models revealed that it can be used as a natural agent for the use in toxoplasmosis¹⁴.

Inhibitory Effect:

A report on the hydroalcohol extracts of *Bunium persicum* showed mixed type inhibitory effects on mushroom tyrosinase¹⁵.

Antioxidant activity:

A report on essential and different extracts of Iranian plant *Bunium persicum* or Zire Kirmani showed potent antioxidant activity by using DPPH assay, β -Carotene bleaching and Ammonium thiocyanate methods. Among the extracts of *Bunium persicum* methanol extract and essential oil showed highest antioxidant activity. The active methanol extract of the *Bunium persicum* was fragmented by Column chromatography which upon more purification founded various antioxidant components like Kaempferol, Caffeic acid and p-Coumaric acid¹⁶.

Anticholesterol Effect:

The effect of *Bunium persicum* extract on lipid profile and cardiovascular capacity was evaluated by using animal models. The results indicated that *Bunium persicum* extract was very effective in hypercholesterolemic animals and helpful in improvement of lipid profile and supplementation of exercise increased cardiorespiratory capacity¹⁷.

Conclusion:

The utilisation of phytomedicine has drawn immense scientific interest because of the important phytoconstituents present in the plants that can help alleviate the Chronic diseases like Diabetes, Cancer, autoimmune disorders etc., besides being cost effective and

less side effects. *Bunium persicum* (Boiss.) B. Fedtsch is one of these herbal medicine which has proved scientifically as one of the promising herbal drug candidate to be developed and needs further research to isolate the specific phytoconstituent to target the specific Chronic disease.

Conflict of interest:

There are no conflicts of interest.

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